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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/219,468	12/23/98	TREFONAS	P 50351

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IM62/0302

EXAMINER

CLARKE, Y

ART UNIT	PAPER NUMBER
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1752

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DATE MAILED:

03/02/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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Office Action Summary

Application No.

09/219,468

Applicant(s)

TREFONAS ET AL.

Examiner

Yvette M Clarke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☐ Responsive to communication(s) filed on 23 December 1998.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☒ Notice of References Cited (PTO-892)
- 15) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 17) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: _____

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DETAILED ACTION

This is written in reference to application number 09/219468 filed on December 23, 1998.

Information Disclosure Statement

1. The Japanese prior art document JP304792/92 has not been considered by the examiner due to the inability to retrieve the said document. The US equivalent US 5968712 has been considered and listed on PTO Form 492.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claims 1-7, 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The use of the term "about" to describe the number of carbon atoms present is considered indefinite. The term "about 6" could be interpreted to mean 5, 5.9, 6 or 6.1. The number of carbon atoms should be referred to as integer values.
4. Claims 6, 8, and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The use of the phrase "substantially free" renders the said claims indefinite. It is unclear to the examiner what the applicant means by "substantially".

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5, 9-17, 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsawa (5847218).

Ohsawa teaches a chemically amplified positive resist composition comprising an organic solvent, an alkali soluble resin, a dissolution inhibitor having an acid labile group, a sulfonium salt of a given formula (1), and a photoacid generator (c. 5, l. 9-20; c. 15, l. 34-c. 16, l. 31). Examples of the said resin include polyhydroxystyrene and derivatives thereof (c. 16, l. 32-57). Ohsawa teaches that in addition to the sulfonium salt of the given formula another photoacid generator can be used. Examples include oxime sulfonic acid derivatives, aryl sulfonic acid ester derivatives, pyrogallol sulfonic acid ester derivatives and n-sulfonyloxyimide derivatives (c. 17, l. 29-42). The composition may further contain various additives such as carboxylic acid derivatives and nitrogenous compounds for improving PED stability, surfactants for facilitating coating and light absorbing agents for reducing irregular reflection. Suitable nitrogenous compounds include tertiary aliphatic amines like triethylamine, tripropylamine, tetramethylamine and trihexylamine (c. 20, l. 4-47). It is the examiner's position, that the use of such tertiary amine compounds constitutes a non-aromatic

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amine compound having 7-20 carbon atoms and also an non-aromatic amine compound having a tertiary nitrogen that is not a ring member and is substituted by at least two secondary or tertiary carbon atoms as claimed by the applicant in claims 1 and 12. The said composition is best suited for fine patterning using deep UV light of 254 to 193 nm (c. 21, l. 45-47). Ohsawa exemplifies coating the said composition onto a silicon wafer and exposed the wafer to light by means of an excimer laser.

Development is done using an aqueous solution of TMAH. It is the examiner's position that it is well-known in the art that silicon wafers are commonly used microelectronic wafer substrates. One of ordinary skill in the art would have been motivated by the teachings of Ohsawa to develop a positive working composition comprising a resin binder, a photoacid generator and a tertiary amine compound in order to develop a resist composition that is suitable at 193 nm for fine patterning.

7. Claims 1-5, 9-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US 5876900).

Watanabe teaches a chemically amplified resist composition containing an organic solvent, a base resin in the form of a polyhydroxystyrene, a photoacid generator, a vinyl ether group containing compound, a dissolution inhibitor and a basic compound (c. 4, l. 1-20). The photoacid generator can be selected from the group consisting of onium salts, B-ketosulfonate derivatives, diazomethane derivatives and disulfone derivatives (c. 6, l. 25-c. 7, l. 18). The basic compound is added to the composition in order to suppress the diffusion rate at which the acid generated from the

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photoacid generator diffuses into the resist coating. Suitable examples include tertiary aliphatic amines (i.e., tri-isobutylamine, tri-n-propylamine, etc.), hybrid amines, amide derivatives and imide derivatives (c. 22, l. 46-c. 24, l. 32). It is the examiner's position, that the said tertiary amine compounds constitutes a non-aromatic amine compound having 7-20 carbon atoms and also an non-aromatic amine compound having a tertiary nitrogen that is not a ring member and is substituted by at least two secondary or tertiary carbon atoms as claimed by the applicant in claims 1 and 12. The resist composition is especially suited for fine patterning with deep UV radiation of 254-193 nm and x-ray (c. 24, l. 54-56). Watanabe exemplifies using the said composition to make an article formed on a silicon wafer, which is exposed to excimer laser and developed with an aqueous solution (c.25, l. 26-c. 26, l. 8). One of ordinary skill in the art would have been motivated by the teachings of Watanabe to develop a positive working composition comprising a resin binder, a photoacid generator and a tertiary amine compound in order to develop a resist composition which has resolution enough to lend itself to fine processing technique and forms a resist pattern resistant to heat during etching.

8. Claims 6-8, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsawa (US 5847218) or Watanabe (US 5876900) as applied to claims 1-5, 9-17 and 19-21 above, and further in view of Hada (US 5929271).

The prior art teachings of Ohsawa and Watanabe are discussed above. They teach all the limitations of the claims except the use of a resin binder free of aromatic

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groups. Hada discloses in his background of invention that the use of resinous ingredients having a benzene ring in the molecular structure such as polyhydroxystyrene, can hardly be used in the photolithographic patterning process by using ArF excimer laser beam due to the relatively low transparency of the resin to light at a short wavelength. Acrylic resins such as polymethyl methacrylate are being used to develop photoresist compositions that are suitable for such purposes (c. 1, l. 53-61). One of ordinary skill in the art would have been motivated to substitute the polyhydroxystyrene resin of Ohsawa or Watanabe for an acrylic type resin in order to make a composition more suitable for fine patterning at 193 nm. This position is based on the background teachings of Hada, which are considered to be known in the art to one of ordinary skill at the time of invention.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kawamura (US 5731123) which positive image forming composition containing an acid generator and a sulfonimide compound.


Thackeray (US 5514520) which teaches a radiation sensitive composition comprising an acid or base generators, a crosslinking agent and phenolic resin.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette M Clarke whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 7-4:30 and Alt. Friday 7-3:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

ymc 
February 25, 2000


JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700